Service Manual

Color Television

CHASSIS : ZT-738V

Caution:
In this Manual, some parts can be changed for improving. Their performance without notice in the parts list. So, if you need the latest parts information, please refer to PL(Parts List) in Service information Center.

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1 SPECIFICATIONS

Items		Chassis
		ZT-738V
TV Standard	Color system	PAL/SECAM, NTSC-4.43 & 3.58(AV) *RF NTSC option
	Sound system	B/G, D/K, I, H, M(NTSC Option)
Rated Voltage		AC 175-265V, 50/60Hz
Power consumption		74W
Sound Output Power		5W + 5W(at 1KHz 80% Mod.)
Channel Conerage	VHF	BAND I : CH 02 ~ CH04(48.25MHz ~ 62.25MHz) BAND II : CH05 ~ CH12(175.25MHz ~ 224.25MHz) CABLE BAND : S01 ~ S03(69.25MHz ~ 83.25MHz), S01 ~ S20, (105,25MHz ~ 294.25MHz) HYPER BAND : S21~S41(303.25 ~ 463.25MHz)
	UHF	BAND IV, V : CH21 ~ CH69(471.25MHz ~ 855.25MHz)
Tuning System		FS Tuning System
Program No. Indication		ON-Screen Display
Program Selection		200 Programs
Aux. Terminal		AV1/2 input Rear <RCA : input, Scart(Option): input, Output> AV1/2 input SIDE or FRONT DVD1(CVBS), DVD2(Y, Cr, Cb) OUTPUT< Monitor OUT>
Remote Control Unit		

2 SAFETY INSTRUCTION

NOTE : BEFORE SERVICING THIS CHASSIS READ THE “X-RAY RADIATION PRECAUTIONS”, “SAFETY PRECAUTIONS” AND “PRODUCT SAFETY NOTICE” BELOW.

X-RAY RADIATION PRECAUTION

1. Excessive high voltage can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The nominal value of the high voltage of this receiver is 25.6KV [Normal Type](27.9KV [Flat Type]) at max beam current. The high voltage must not, under any circumstances, exceed 28.6KV [Normal Type] (30.9KV [Flat Type]). Each time a receiver requires servicing, the high voltage should be checked. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY Radiation in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type tube as specified in the parts list.

SAFETY PRECAUTION

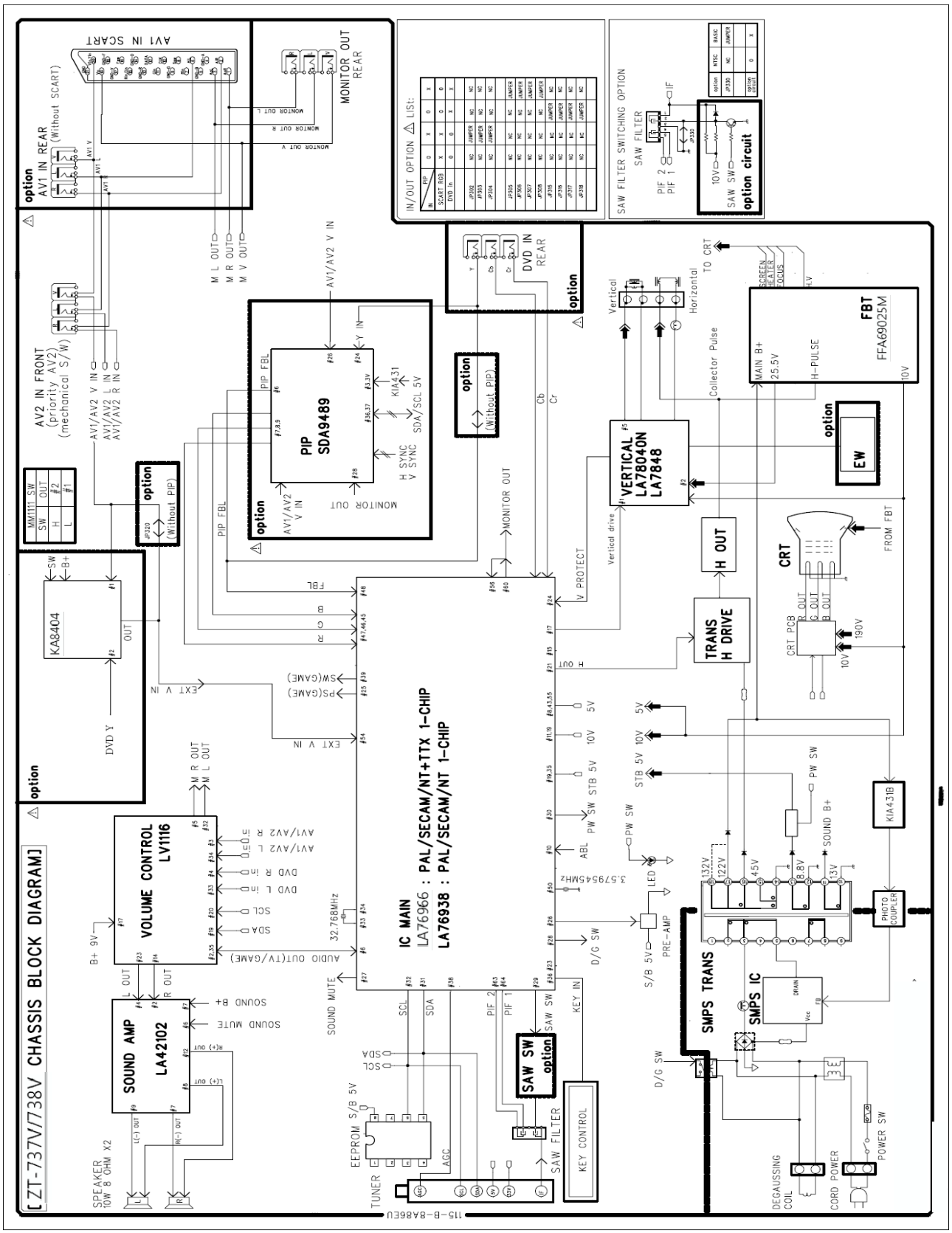
1. Potentials of high voltage are present when this receiver is operating. Operation of the receiver outside the cabinet or with the back cover removed involves a shock hazard from the receiver.
   1) Servicing should not be attempted by anyone who is not thoroughly familiar with the precautions necessary when working on high voltage equipment.
   2) Always discharge the picture tube to avoid the shock harzard before removing the anode cap.
   3) Discharge the high potential of the picture tube before handling the tube. The picture tube is highly evacuated and if broken, glass fragments will be violently expelled.
2. If any Fuse in this TV receiver is blown, replace it with the FUSE specified in the Replacement Parts List.
3. When replacing a high wattage resistor (metal oxide film resistor) in the circuit board, keep the resistor 10 mm away from circuit board.
4. Keep wires away from high voltage or high temperature components.
5. This receiver must operate between AC 175-265 volts, 50/60Hz. NEVER connect to DC supply or any other power or frequency.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this equipment have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-RAY RADIATION protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this manual and its supplements, electrical components having such features are identified by designated symbol ‘⚠’ on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitutes replacement parts which do not have the same safety characteristics as specified in the parts list may create X-RAY Radiation.

3 Description of ZT-737V/738V CHASSIS

3.1 BLOCK DIAGRAM

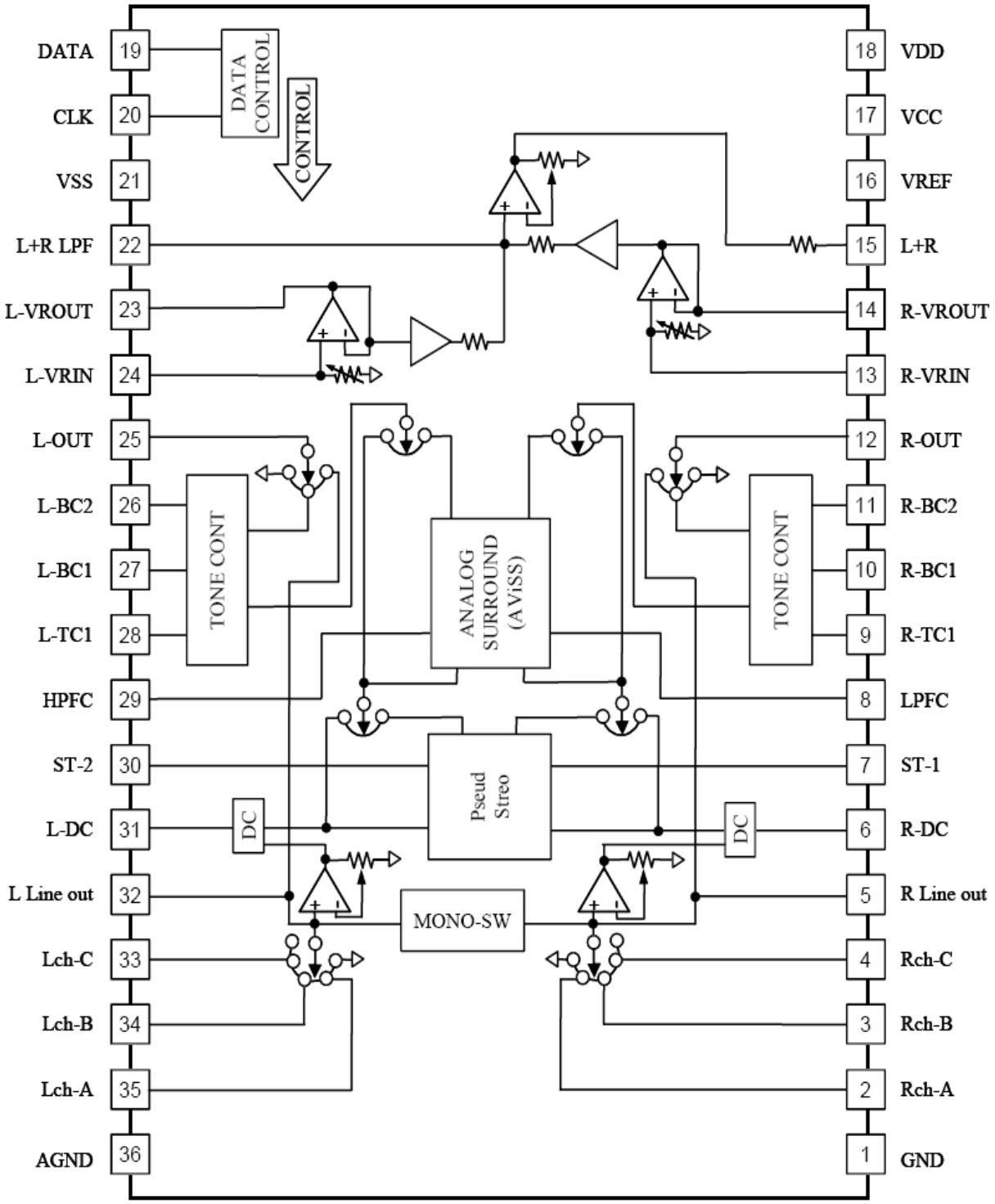


3.2 Overview of Main IC

Pin Assignment of LA76966

PIN	FUNCTION	PIN	FUNCTION
1	SIF Output	64	VIF Input1
2	VIF AGC	63	VIF Input2
3	SIF Input	62	IF Ground
4	FM Filter	61	RF AGC Output
5	FM Output / Selected Audio Output	60	Video Output
6	Audio Output	59	AFT Filter
7	SIF APC Filter	58	APC Filter
8	IF Vcc	57	Black Level Det. Filter
9	Ext. Audio Input or VM Output	56	Internal Video Input(S-C IN)
10	ABL	55	Video/Vertical Vcc
11	RGB Vcc	54	External Video Input(Y IN)
12	Red Output	53	Chroma APC Filter
13	Green Output	52	Selected Video Output or fsc Output
14	Blue Output	51	Cr Input
15	East/West Output	50	4.43MHz Crystal
16	V Ramp Osc. Capacitor	49	Cb Input
17	Vertical Output	48	Fast Blanking Input or DVD-Y
18	VCO IREF	47	Red Input or NC
19	Horizontal/BUS Vcc	46	Green Input or YC-Y
20	Horizontal AFC Filter or YC-C	45	Blue Input
21	Horizontal Output	44	Flyback Pulse Input
22	Video/Vertical/BUS Ground	43	CCD Vcc
23	P00/INT0/SO0	42	CPU Ground
24	P01/INT1/SI0,SB0	41	FILSCL
25	P02/SCK0	40	FILT
26	P03/INT3	39	RES#
27	P14/SI1,SB1	38	P13
28	P15/SCK1	37	P07/AN7
29	P16/T1PWM/SO1	36	P06/AN6
30	P17/TVPWMD	35	VDD
31	P04/AN4	34	XT2
32	P05/AN5	33	XT1

Block Diagram of LV1116



4. ALIGNMENT INSTRUCTIONS

4.1 MICROCONTROLLER CONFIGURATION : SERVICE MODE

To switch the TV set into service mode please see instruction below.

Within 2 seconds press the key sequence :

DISPLAY - MUTE - WIDE/REVEAL

The SERVICE menu is displayed as below,

S1	Heat Run	S7-2	Reg, 2
S2	Screen	S7-3	PIP
S3	Sound Test	S8-1	W&B
S4	Reserved	S8-2	Scr W&B
S5	AGC	S9	Dp
S6-1	4 : 3 GEO 50	S10-1	Option
S11-1	4 : 3 GEO 60	S10-2	Device
S11-2	16 : 9 GEO		
S11-3	ZOOM GEO	S12	Outgoing
S7-1	Reg. 1		

or Using the Service Remote controller, you can enter service mode directly.
To exit SERVICE menu press menu key or Stand By key.

4.2 SERVICE MODE NAVIGATION

Pr Up/Down remote keys : cycle through the service items available.
Vol -/+ remote keys : Dec./Increment the values within range - Cycle trough option bits.

ALIGNMENT INSTRUCTIONS

4.3 CONTROL BITS

There are 4 option bytes available (16 bits in all). These option bits are available from FACTORY and SERVICE mode. First find the OPTION1, OPTION2, OPTION3 or OPTION4 control, and then use the UP/DOWN and PLUS/MINUS keys on the relevant remote keypad to control the bits. The table below shows the three option bytes available;
Default setting in case of virgin EEPROM are shown in light grey.

<OPTOIN1>

	B7	B6	B5	B4	B3	B2	B1	B0
1	TEXT TOP 'OFF'	TEXT FLOF 'OFF'	Fixed to '0'	Teletext ON	NTSC M OFF	TUNER OPTIONS (see table below) default : GDC		
0	TEXT TOP 'ON'	TEXT FLOF		Teletext OFF	NTSC M ON			

<OPTOIN2>

	B7	B6	B5	B4	B3	B2	B1	B0
1	Praytime 'ON'	SHAHAB Logo ON	CRT slim	Koran functions enabled	Local key option (see table below) default :6key(11)		Fixed to '1'	Fixed to '0'
0	Praytime 'OFF'	SHAHAB Logo OFF	CRT normal	Koran functions disabled				

<OPTOIN3>

	B7	B6	B5	B4	B3	B2	B1	B0
1	Curtain OFF	Teletext language table			Fixed to '0'	PIP OFF	Fixed to '0'	Fixed to '0'
0	Curtain ON					PIP ON		

<OPTOIN4>

	B7	B6	B5	B4	B3	B2	B1	B0
1	Not used, must be set to 1 for future compatibility			Fixed to '0'	Koran direct key enabled	Fixed to '0'	Fixed to '0'	DVD OFF
0					Koran direct key disabled			DVD ON

4.4 USER GUIDE

4.4.1 ENTERING FACTORY MODE
To switch the TV set into FACTORY mode, use the factory remocon, and press on S10.
The factory menu will appear on the screen, showing “VER xx.xx DATE d xx m xx y xx”
(where xx.xx is the software version, “d xx m xx y xx” means date).

4.4.2 ENTERING OPTION BITS MENU
To find the option bits, push the button S10 one more.
OPTION BITS TABLE as below will appear.

ex).

(S10-1)
EPROM & OPTION & DEVICE EDIT

Ver. xx.xx DATE dxx mxx yxx

	7			bit			0	HEX
OPTION1	1	0	1	1	1	0	0	1	B9
OPTION2	0	0	1	1	1	1	1	0	3E
OPTION3	1	1	1	1	0	1	0	0	F4
OPTION4	1	1	1	0	1	0	0	0	E8

4.4.3 SELECTING OPTION BITS
From left to right, bits 7 to 0 are shown. Navigation is done from the with the factory remocon with the VOL MIN and VOL MAX buttons. The selected bit is changed RED from BLUE.

4.4.4 TOGGLING OPTION BITS
This is done by using the PR UP and PR DOWN buttons.

4.4.5 CHANGING OPTION1,2,3,4
to go option2, go to the option1 with VOL left/right buttons.
and push the PR UP and PR DOWN buttons. Option1,2,3,4 are changed as below

< OPTION1 -> OPTION2 -> OPTION3 -> OPTION4 -> OPTION1 >

4.4.6 EXITING OPTION BITS MENU
To exit from option bits table, Push the button S10 twice.

4.5 CONTROL DESCRIPTION

4.5.1 OPTION 1 BITS
FLOF/Fastext (Bit 6)
Enables/disables the TV from displaying FLOF row 24 link titles.

Teletext ON/OFF (Bit 4)
Enables/disables the Teletext on TV. If Teletext is disabled, user can not select clock prog and in features menu.

NTSC M ON/OFF (Bit 3)
Enables/disables NTSC M function.

Tuner (Bits 2, 1 & 0)
Configures the software to communicate with the tuner via i2c bus. Incorrect configuration may not be immediately obvious, but will result in loss of functionality (e.g. unable to tune UHF channels, unable to tune some hyperband channels).

Bit2	Bit1	Bit0	LNA	Tuner	
0	0	0	No	Philips(external AGC)	UV1316A I-4
0	**0**	**1**	**No**	**GDC**	115-B-8A86EU
0	1	0	No	LG	TAEM-G008D
0	1	1	No	Samsung	TECC2949PG35W
1	0	0	-	Should not be used	
1	0	1	-	Should not be used	
1	**1**	**0**	**yes**	**LG**	**TAEM-G605D**
1	1	1	-	Should not be used	

4.5.2 OPTION 2 BITS
Daewoo Logo ON/OFF (Bit 6)
Enables/disables the display of Shahab logo at power on.

CRT slim/normal (Bit 5)
You must enable this bit for slim CRT which need V-SHIFT adjustment.

Koran functions enabled/disabled (Bit 4)
Enables/disables the Koran function at power ON.
If OSD language is not Persian or Arabic, this function is disabled.

Local key option (Bit 3 & 2)

	11	10	01	00
0 mV ~ 700 Mv	NC	Not used	Power(ST_BY on/off)	Not used
700 mV ~ 1.40V	Menu		Menu	
1.40V ~ 2.10 V	Prog. Up		Prog. Up	
2.10 V ~ 2.80 V	Prog. Dwn		Prog. Dwn	
2.80 V ~ 3.50 V	Vol. Up		Vol. Up	
3.50 V ~ 4.20 V	Vol. Dwn		Vol. Dwn	
4.20 V ~ 5.00 V	TV/AV		TV/AV	

4.5.3 OPTION 3 BITS
Curtain ON/OFF (Bit 7)
Enables/disables the curtain function at power ON.

Teletext language option (Bit 6, 5& 4)

	Bit 6, 5& 4
Latin West	000
Latin East	001
Russia	010
Persia	011
Arabic	100
Automatic	101
...	
Automatic	111

recommend Automatic mode(111).

PIP ON/OFF (Bit 2)
Enables/disables PIP function.

4.5.4 OPTION 4 BITS
DVD ON/OFF (Bit 0)
Enables/disables DVD function.
0 DVD ON : RF -> AV1/AV2 -> DVD1 -> DVD2 -> GAME
1 DVD OFF : RF -> AV1/AV2 -> GAME

Koran direct key enabled/disabled (Bit 3)
When set to 1, pressing Yellow key makes the pray menu come on screen. When set 0, the function is disabled. If OSD language is not Persian, this option bit is ignored.

4.5.4 TV SET ALIGNMENT

(1) Screen (G2) Alignment (S2)

(1)-1. Screen Alignment will be performed after sufficient Heat-Run of Set.

(1)-2. Press the "S1" key of service remote controller to the heat run mode off.

(1)-3. Receive the RETMA(or COLOR BAR) PATTERN.

(1)-4. Press the "S2" key on the service remocon.

#. Preparatory Focus (G1) Alignment

- You must try to Focus Alignment roughly for exact SCREEN alignment.
- Adjust the Focus VR of the FBT (T401) so that the center circle of RETMA Signal is clear and sharp.

(1)-5. Turn round the Screen Volume of FBT until to the horizontal line of screen disappear.

(1)-6. Press the "S2" key of service remote controller again.

(2) AUTO AGC Alignment (S5)

(2)-1. Make sure option bits are correct for the tuner fitted on the chassis.

(2)-2. Receive the COLOR BAR PATTERN(or similar pattern) of VHF-HIGH channel.

(2)-3. Control the RF signal level at 62±1dBuV

(2)-4. Press "S5" key of the service remocon, so that AGC is automatically adjusted.

* you can manually adjust, using the under side AGC key of remote controller.

(3) Geometry Alignment (S6)

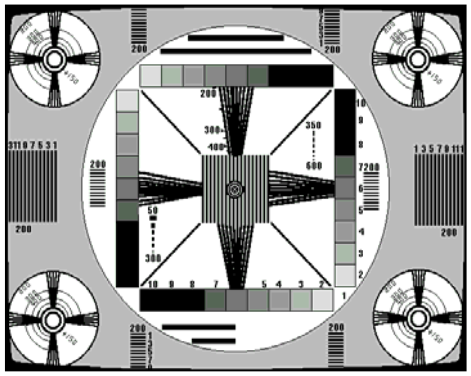
Receive the RETMA PATTERN and Press the "S6" key of service remocon.

(3)-1. Using the " ◄ VOL / VOL ► " key of "H-CENTER" in service remote controller, Adjust the Horizontal Center of the picture.

(3)-2. Using the " ◄ VOL / VOL ► " key of "H-SIZE" in service remote controller, Adjust the Horizontal Size of the picture(RETMA PATTERN).

(3)-3. Using the " ◄ VOL / VOL ► " key of "V-SHIFT(Slim CRT) or V-CENTER(Normal CRT)" in service remote controller, Adjust the Vertical Center of the picture.

(3)-4. Using the " ◄ VOL / VOL ► " key of "V-SIZE" in service remote controller, Adjust the Vertical Size of the picture.



(4) WHITE BALANCE Alignment (S8)
(4)-1. Select a dark picture and adjust R-BIAS and G-BIAS to the desired colour temperature.
(4)-2. Select a bright picture and adjust R-DRIVE and B-DRIVE to the desired colour temperature.

(5) SUB-BRIGHTNESS ALIGNMENT (S9)
(5)-1. Receive PAL RETMA signal.
(5)-2. Using the " ◄ VOL / VOL ► " key of "SUB-BRI" in service remote controller, Adjust the sub-bright(brightness) for suitable brightness of picture.

5 RECOMMANDED EEPROM DATA FOR ZT-737V/738V

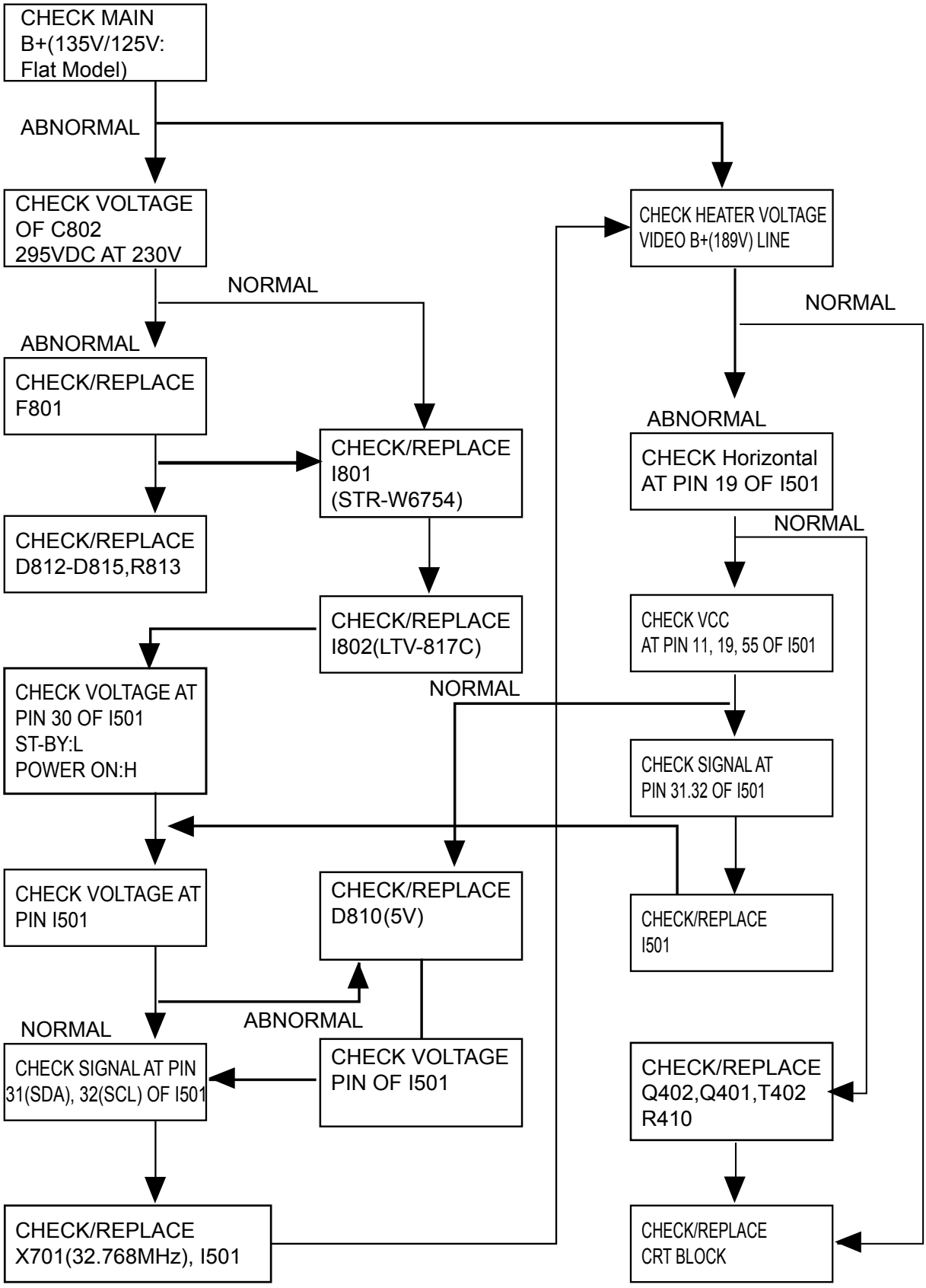
adjust data fix data

NAME	738V	737V	NAME	738V	737V	NAME	738V	737V	NAME	738V	737V
IF CONTROL (S5)			(S11-2)			(S7-1)			**(S8-1)**		
AUTO RF AGC START			W-V-CENT	0	0	PR-SHOOT	3	3	R-DRIVE	63	63
RF AGC D	28	28	W-V-SIZE	-35	-35	OV-SHOOT	3	3	B-DRIVE	63	63
AGC LVL	4	4	W-H-CENT	0	0	WPL OPE	2	2	R-BIAS	140	140
O MODE L	0	0	W-EW-DC	0	0	Y GAMMA	1	0	B-BIAS	140	140
O MODE SW	1	1	W-V-LIN	0	0	DC-REST	1	0	G-BIAS	140	140
SYNC SEN	4	4	W-V-SC	0	0	B-START	1	0	G-DRIVE	8	8
V-SETUP	0	0	W-EW-AMP	-14	0	B-S-GAIN	2	2	**(S8-2)**		
VBLK SW	0	0	W-EW-TIL	0	0	BELL SW	1	1	S R-DRIV	63	63
(S6 50Hz)			W-EW-C-B	0	0	BELL AOL	3	3	S G-DRIV	8	8
H-CENTER	10	8	W-EW-C-T	0	0	EQU ON	0	0	S B-DRIV	63	63
V-SHIFT(cent)	0	25	WV-CE-60	0	-20	EQU ADJ	0	0	S R-BIAS	40	40
V-SIZE	78	56	WV-SIZ-60	+3	+3	H-CENT-GM	21	23	S G-BIAS	230	230
H-SIZE	33	*	WH-CE-60	+5	+5	(S7-2)			S B-BIAS	40	40
EW-PARA	33	*	W-H-SIZ-60	0	0	RYBY-ANG	8	8	S BRIGT	35	35
EW-COR-T	10	*	W-EW-PA-60	0	0	RYBY-G-B	8	8	(S9)		
EW-COR-B	8	*	W-EW-TP-60	0	0	RY D PA/NT	24	24	SUB-BRI	44	44
EW TRAP	28	*	W-EW-B-60	0	0	BY D PA/NT	24	24	DP-CONT	10	10
V-CEN-TX	0	0	W-EW-T-60	0	0	OSD CONT	5	5	DP-COLOR	27	27
V-SIZ-TX	-4	-2	(S11-3)			C-BYPASS	1	1	DP-SHARP	7	7
V-LINEAR	21	20	E-V-CENT	0	0	OSD-C-GM	5	5	V-LVL	6	6
V-S COR	16	15	E-V-SIZE	+15	+15	H-SIZE-GM	2	2	V-LVL-D	1	1
EW-C-SW	0	0	E-H-CENT	0	0	RY D SECAM	13	13	COLOR-NT	-10	-10
V-COMP	7	7	E-EW-DC	0	0	BY D SECAM	26	26	DP-CON-W	-27	-27
H-SIZE-C	4	4	E-V-LIN	0	0	RY D DVD2	16	16	DP-CON-E	10	10
H-BLK-R	4	4	E-V-SC	0	0	BY D DVD2	16	16	SUB-BRI-TX	-10	-10
H-BLK-L	4	4	E-EW-AMP	7	7	PIP (S7-3)					
H-BLK-SW	1	1	E-EW-TIL	0	0	CONTRAST	15				
V-CENTER(sh	40	0	E-EW-C-B	0	0	BRIGHTNESS	0				
EW-PA-TX	-4		E-EW-C-T	0	0	COLOR	8				
(S11-1:60Hz)			EV-CE-60	0	0	TINT	0				
H-CEN-60	5	5	EV-SIZ-60	-3	-3	SHARPNESS	7				
V-CEN-60	0	0	EH-CE-60	+5	+5	R	47				
V-SIZE-60	-2	-2	E-H-SIZ-60	0	0	G	34				
H-SIZE-60	0	0	E-EW-PA-60	0	0	B	64				
EW-PA-60	0	0	E-EW-TP-60	0	0	H-SHIFT	0				
EW-T-60	0	0	E-EW-B-60	0	0	V-SHIFT	0				
EW-B-60	0	0	E-EW-T-60	0	0						
EW-TP-60	0	0									
V-SH-60	-3	-3									

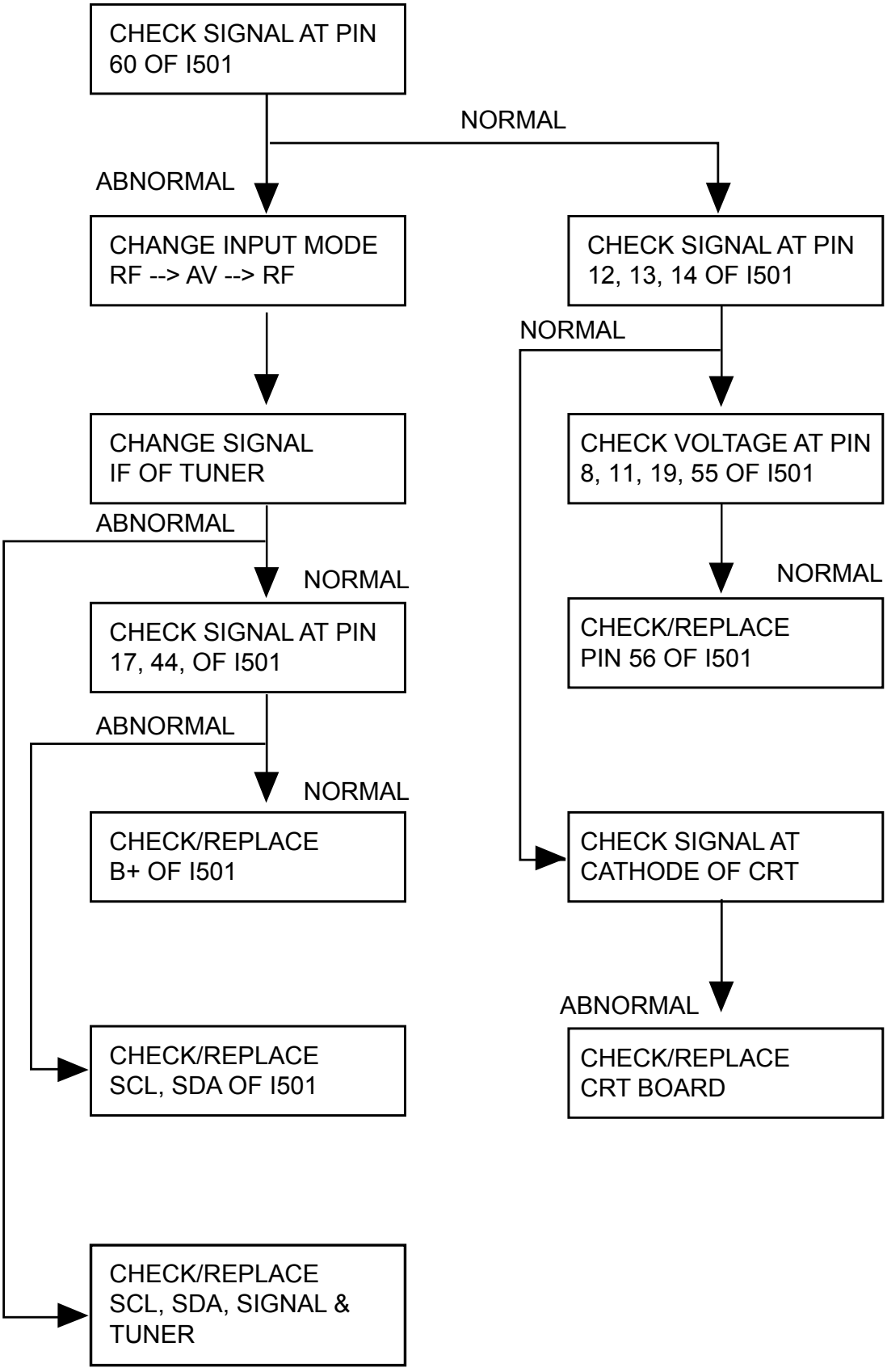
CRT BOARD
AV STEREO
ZERON Tech

11. TROUBLE SHOOTING CHARTS

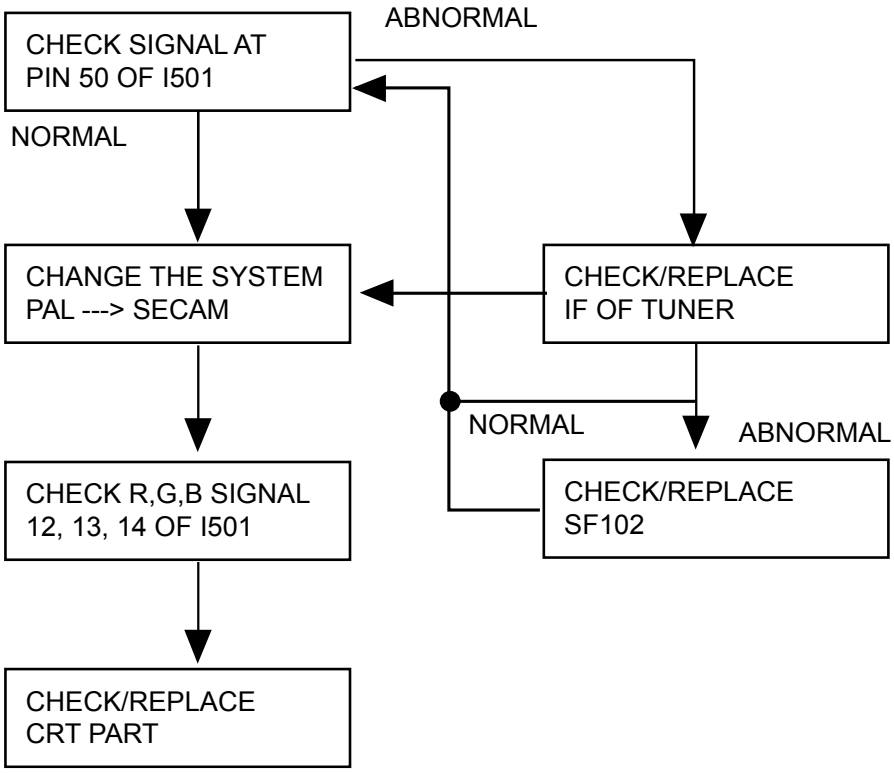
1. NO RASTER



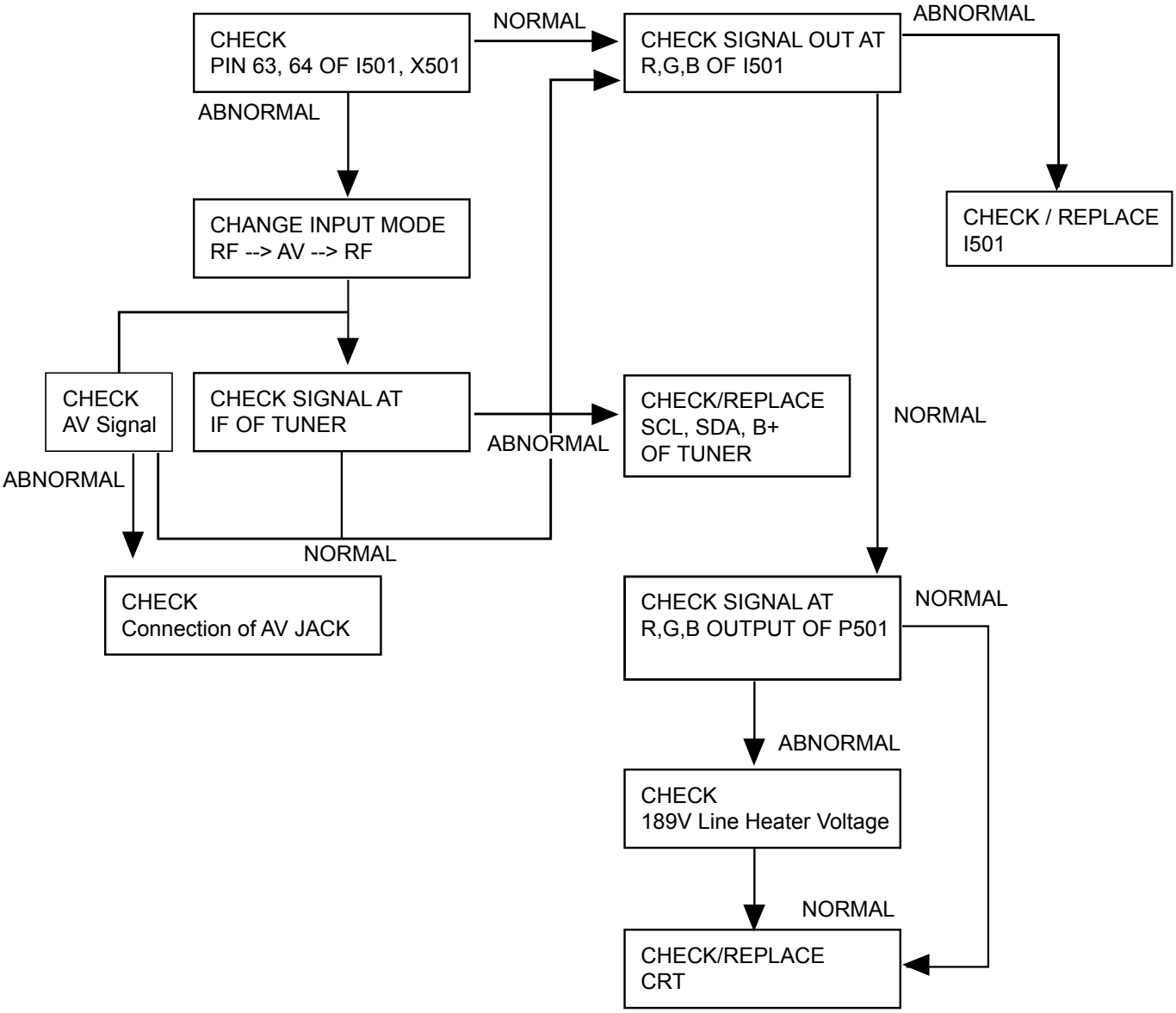
2. NO PICTURE(RASTER OK)


CHECK SIGNAL AT PIN 60 OF I501
NORMAL
ABNORMAL
CHANGE INPUT MODE RF --> AV --> RF
CHECK SIGNAL AT PIN 12, 13, 14 OF I501
NORMAL
CHANGE SIGNAL IF OF TUNER
CHECK VOLTAGE AT PIN 8, 11, 19, 55 OF I501
ABNORMAL
NORMAL
NORMAL
CHECK SIGNAL AT PIN 17, 44, OF I501
CHECK/REPLACE PIN 56 OF I501
ABNORMAL
NORMAL
CHECK/REPLACE B+ OF I501
CHECK SIGNAL AT CATHODE OF CRT
ABNORMAL
CHECK/REPLACE SCL, SDA OF I501
CHECK/REPLACE CRT BOARD
CHECK/REPLACE SCL, SDA, SIGNAL & TUNER

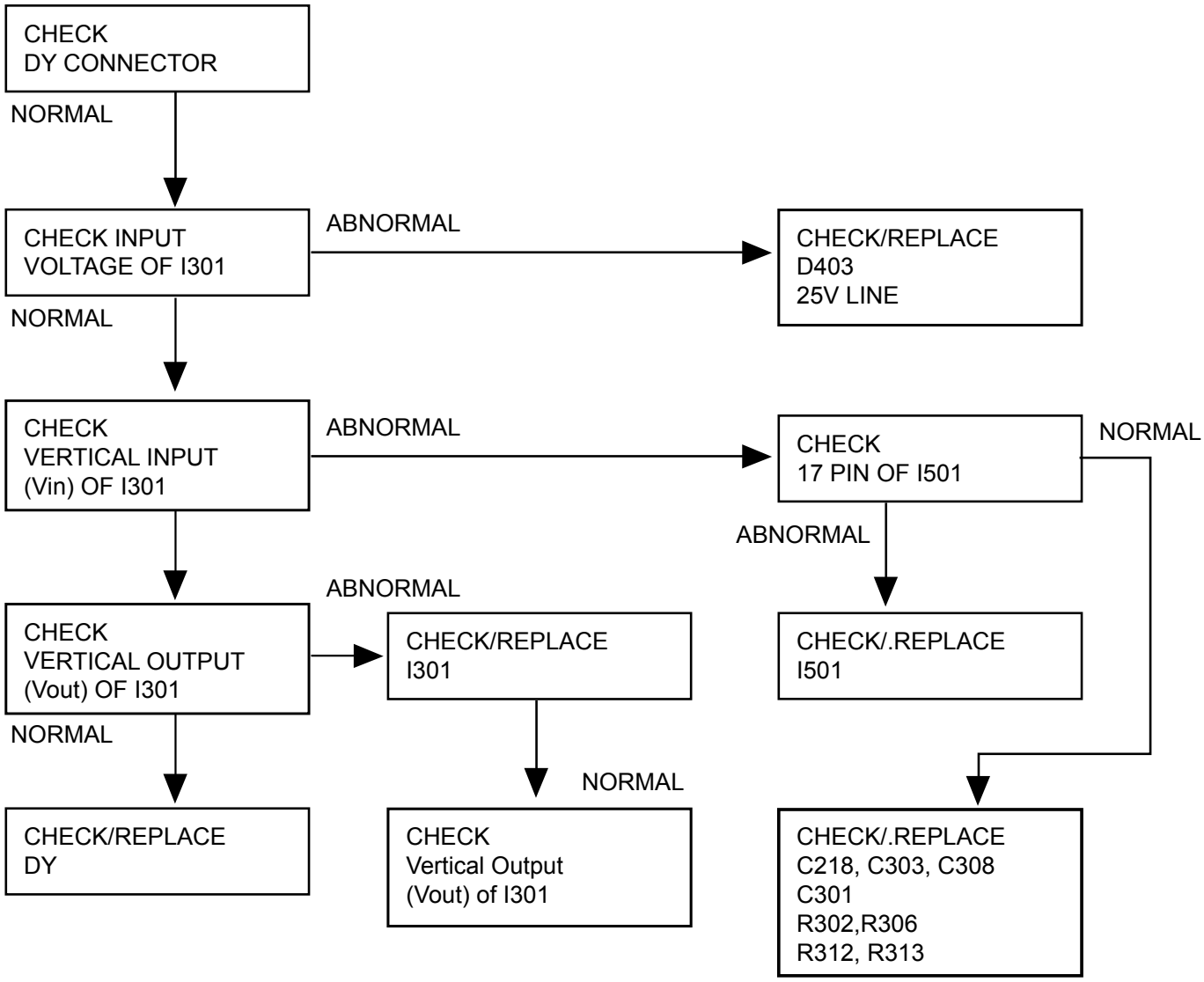
3. NO COLOR


CHECK SIGNAL AT
PIN 50 OF I501
ABNORMAL
NORMAL
CHANGE THE SYSTEM
PAL ---> SECAM
CHECK/REPLACE
IF OF TUNER
NORMAL
ABNORMAL
CHECK R,G,B SIGNAL
12, 13, 14 OF I501
CHECK/REPLACE
SF102
CHECK/REPLACE
CRT PART

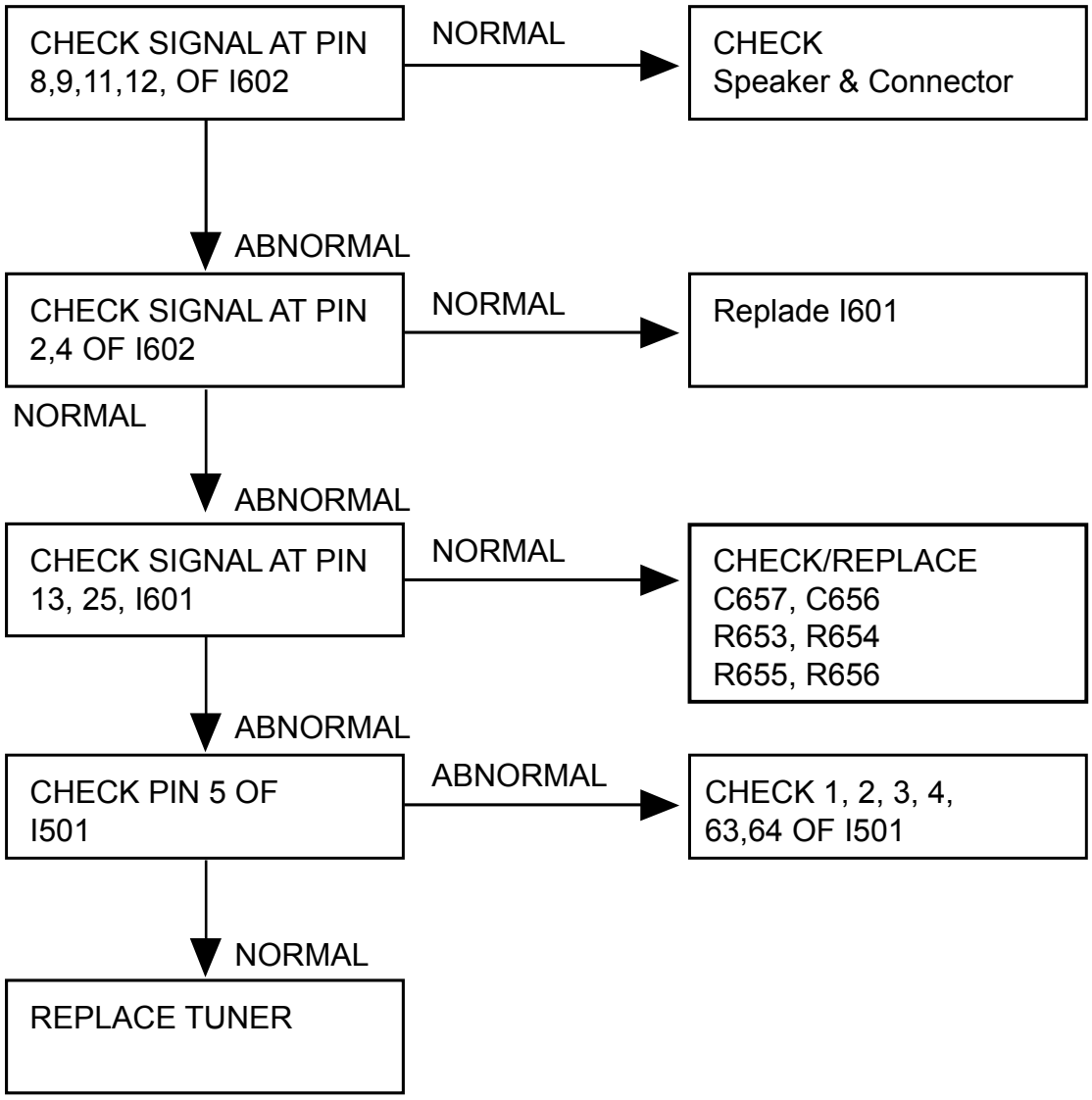
4. NO PICTURE


CHECK
PIN 63, 64 OF I501, X501
NORMAL
CHECK SIGNAL OUT AT
R,G,B OF I501
ABNORMAL
ABNORMAL
CHECK / REPLACE
I501
CHANGE INPUT MODE
RF --> AV --> RF
CHECK
AV Signal
CHECK SIGNAL AT
IF OF TUNER
CHECK/REPLACE
SCL, SDA, B+
OF TUNER
ABNORMAL
NORMAL
ABNORMAL
NORMAL
CHECK
Connection of AV JACK
CHECK SIGNAL AT
R,G,B OUTPUT OF P501
NORMAL
ABNORMAL
CHECK
189V Line Heater Voltage
NORMAL
CHECK/REPLACE
CRT

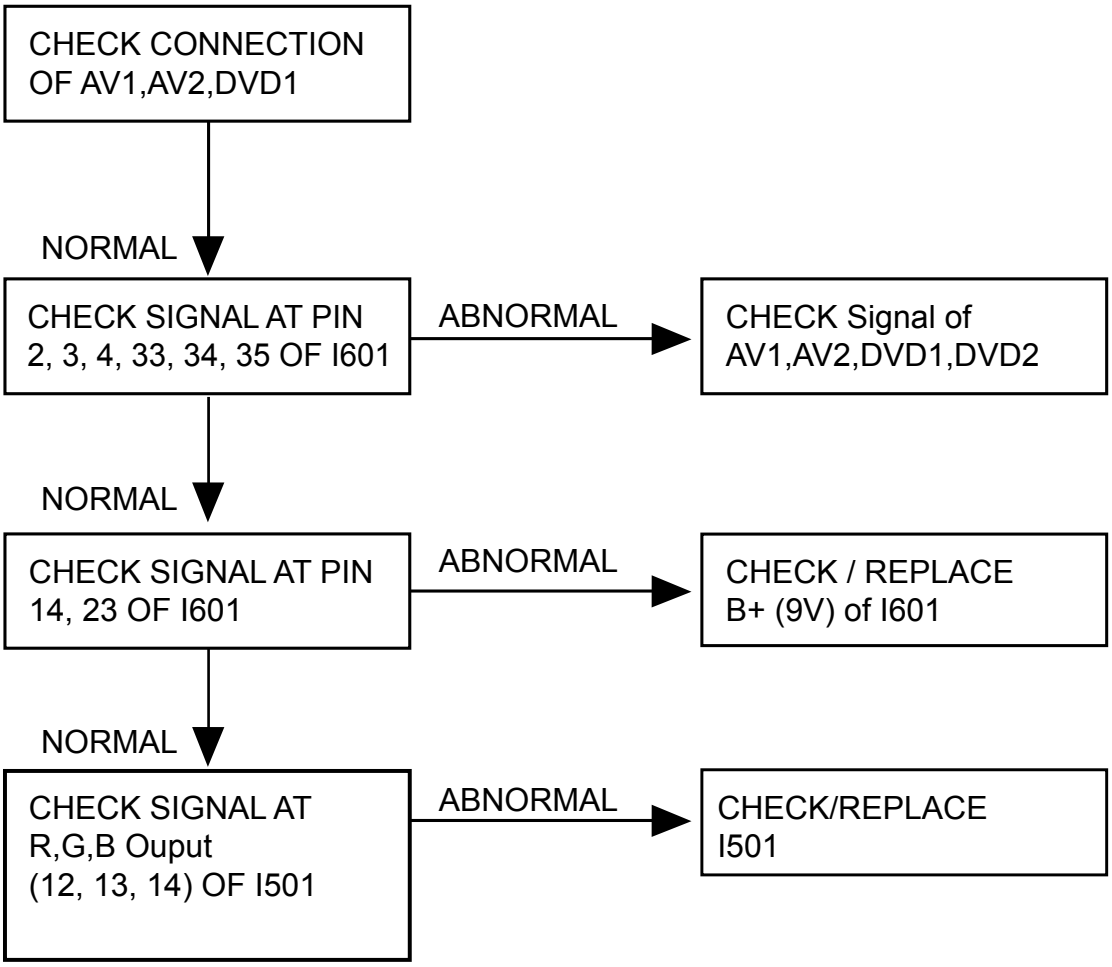
5. NO VERTICAL SCANNING(ONE HORIZONTAL LINE RASTER)



6. NO MAN SOUND(RF)



7. NO EXTERNAL AV(RF OK)


CHECK CONNECTION OF AV1,AV2,DVD1
NORMAL
CHECK SIGNAL AT PIN 2, 3, 4, 33, 34, 35 OF I601
ABNORMAL
CHECK Signal of AV1,AV2,DVD1,DVD2
NORMAL
CHECK SIGNAL AT PIN 14, 23 OF I601
ABNORMAL
CHECK / REPLACE B+ (9V) of I601
NORMAL
CHECK SIGNAL AT R,G,B Ouput (12, 13, 14) OF I501
ABNORMAL
CHECK/REPLACE I501

8. REMOTE CONTROL UNIT TROUBLE